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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,472

04/07/2005

Stefan Holler

5083-47PUS

6529

27799

7590

02/22/2008

COHEN, PONTANI, LIEBERMAN & PAVANE
551 FIFTH AVENUE
SUITE 1210
NEW YORK, NY 10176

EXAMINER

SUITTE, BRYANT P

ART UNIT

PAPER NUMBER

4191

MAIL DATE

DELIVERY MODE

02/22/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/520,472	Applicant(s) HOLLER ET AL.	
	Examiner BRYANT SUITTE	Art Unit 4191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 12-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/07/2005</u> . | 6) <input type="checkbox"/> Other: ____. |

**FUEL CELL STACK COMPRISING A COUNTERFLOWING COOLING SYSTEM AND
A PLURALITY OF COOLANT COLLECTING DUCTS PARALLEL TO THE AXIS OF
THE STACK**

Examiner: Suitte

10/520,472

Art Unit: 4191

February 14, 2008

Claim Rejections - 35 USC § 112

1. Claims 19 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. The term "length" in claims 19 and 25 line 1 is a relative term that renders the claims indefinite. The term "length" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. For the purpose of compact prosecution, the recitation "length" is interpreted as the "length of one lap of cooling channel".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 12-14 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Vitale et al. (US 6,066,408).

Regarding claim 12, Vitale teaches a proton exchange membrane fuel cell stack that comprises a membrane electrode assembly and a plurality of cooling channels between adjacent membrane electrode assemblies. Each channel having two open ends which flow in a counter-flow or serpentine manner in each fuel cell. See figure 6.

Regarding claim 13, Vitale teaches an inlet and outlet for cooling channels of the said fuel cell stack. The inlet and outlet for cooling channels are arranged one above another in a stack formation aligning the said fuel cell stack manifolds. While the examiner recognizes that the reference does not recite common conductor collector per se, it is however, the perception of the examiner that since the said fuel cell cooling plates comprise manifold inlets and outlets, it necessarily means that the manifolds operate as common conductor collectors. See figure 2A, 2B, 6 and column 7 lines 8-20.

Regarding claim 14, Vitale teaches of a plurality of manifolds, as stated in the above paragraph to be common collector channels, are arranged in parallel on two sides of said fuel cell stack that allow for the inlet and outlet channels to communicate by aligning the holes in the various fuel cell plates. See figure 2A, 2B, 6 and column 7 lines 8-20.

Regarding claim 17, Vitale teaches a fuel cell stack wherein electrode assemblies comprises an anode electrode and a cathode electrode, wherein said

channels are open toward said anode electrode and conduct a fuel supply toward said anode electrodes. See figure 2A, 2B and 2C.

5. Claims 12-16 and 20-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Nelson (US 6,689,500).

Regarding claim 12, Nelson teaches a fuel cell stack comprising a PEM construction with a MEA construction, said fuel cell having a plurality of channels for cooling adjacent to the MEA construction. The fuel cell cooling channels have two open ends which flow in a counter-flow direction. See figure 1, 6A and 6B and column 1 lines 16-20.

Regarding claim 13, Nelson teaches the said fuel cell cooling channels have inflow and outflow sides, the said fuel further comprises a common collector channel, wherein the inflow and outflow sides are connected one above the other. See figure 1, 6A and 6B.

Regarding claim 14, Nelson teaches the said fuel cell has a plurality of common collector channels arranged in parallel on two sides of said fuel cell such that each one of the inflow and outflow sides of said channels runs into one of said plural common collector channels. See figure 1, 6A and 6B.

Regarding claim 15, Nelson teaches the said fuel cell stack cooling channels are utilized exclusively for cooling said fuel cell. See column 2 lines 5-8.

Regarding claim 16, Nelson teaches the fuel cell stack where the MEA comprises an anode electrode and cathode electrode, where said channels are open toward said

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cathode electrode and conduct an oxygen supply toward cathode electrodes. See figure 5.

Regarding claim 20, Nelson teaches the fuel cell stack comprises a recess at the end of the said fuel cell thereby forming a common collector channel. See figure 1.

Regarding claim 21, Nelson teaches the fuel cell stack has a gasket that seals the edge surrounding a bipolar plate of said fuel cell. The bipolar plate with the sealing edges is arranged between adjacent fuel cells, with the common collector channel being formed by recesses in said sealing gaskets. See figure 1.

Regarding claim 23, Nelson teaches a square fuel cell stack that has an axis through the center of stack that is parallel to the common collector channel. See figure 1. While the examiner recognizes that the reference does not recite a physical axis per se, it is however, the perception of the examiner that the square fuel cell stack has a straight line through the body of the fuel cell; it necessarily means that the fuel cell stack has an axis that runs parallel to the common collector channel.

Regarding claim 27, Nelson teaches the fuel cell stack with a common collector channel is formed by an enclosure along an edge of said fuel cell. See figure 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 18 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (6,689,500) as applied to claims 12-16 and 20-21 above, and further in view of Koschany (2003/0012986).

Regarding claims 18 and 24, Nelson teaches a fuel cell stack comprising a PEM construction with a MEA construction, said fuel cell having a plurality of channels for cooling adjacent to the MEA construction. The fuel cell cooling channels have two open ends which flow in a counter-flow direction. However, Nelson does not teach cooling channel with a width of less than 3 mm.

Koschany teaches that an air cooled fuel cell stack comprises cooling channels with a width of 1.0 mm. See paragraph 30 and 29. The 1.0 mm width cooling channels allows for the dispersion of oxygen. Therefore it would be obvious to one of ordinary skill in the art to utilize the 1.0 mm width cooling channels with the fuel cell stack of Nelson because Koschany teaches the even distribution of oxygen to sufficiently cool the cathode structure.

Regarding claims 22 and 26, the disclosure of Koschany differs from Applicant's claims in that Koschany does not disclose a fuel cell stack cooling channel with a pressure of 0.1 to 10 bar. However, Koschany recognize the pressure of the cooling channel is determined by the size and power output of each fuel cell stack. See paragraph 54 last sentence. Therefore, it would have been within the skill of the ordinary artisan to adjust the size and power output of the fuel cell stack to reach a pressure of 0.1 to 10 bar. *Discovery of optimum value of result effective variable in*

known process is ordinarily within skill of art. In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

8. Claims 19 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson (6,689,500) as applied to claims 12-16 and 20-21 above, and further in view of Shelekhin et al. (5,972,530).

Regarding claims 19 and 25, Nelson teaches a fuel cell stack comprising a PEM construction with a MEA construction, said fuel cell having a plurality of channels for cooling adjacent to the MEA construction. The fuel cell cooling channels have two open ends which flow in a counter-flow direction. However, Nelson does not teach a cooling channel with a length in the range of 20 mm to 200 mm.

Shelekhin et al. teaches an air cooled fuel cell stack having cathode and anode fluid flow plates with a height of 10 to 750 mm. See column 3 lines 53-55. It is the position of the examiner that the cooling channel must be equal to the cathode and anode fluid flow plates to adequately fit the construction of the fuel cell stack. Therefore it would be obvious to one ordinary skill in the art to utilize the height requirements of Shelekhin with the fuel cell stack of Nelson because Shelekhin teaches the height is dependent on the power requirements and space available of the fuel cell stack.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRYANT SUITTE whose telephone number is (571)270-3961. The examiner can normally be reached on Mon - Thur 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BS

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 4191